examination on the west shore of Southampton Island, and 95 miles of boat survey (geological) of the east side of Ungava Bay; total surveys, 2,041 miles.

Large collections of rocks and fossils were made, anthropological studies were carried on, and large collections of flora and fauna were obtained. The average temperatures at the winter camp in Hudson Bay were: December, −8.1°; January, −22.4°; February, −27.8°; and March, −20.6.

THE USEFUL PLANTS OF GUAM.

The Government press has issued (Smithsonian Institution) a volume of 416 pages on this subject. It forms Volume IX of "Contributions from the United States National Herbarium," and is a notable accession to our knowledge of this little island, the result of fortunate circumstances making it possible to secure a careful botanical study of it. The author is Mr. W. E. Safford, assistant botanist in the Department of Agriculture. For several years, when a lieutenant in the U. S. Navy, he had an opportunity to study the plants of Upolu and Tutuila, of the Samoan group, and of Oahu, of the Hawaiian group. He was Assistant Governor of Guam in the year ending August, 1900, and the book is an elaboration of notes and observations made in that year, and during the earlier years of his studies among the Pacific islands.

While the title is "The Useful Plants of Guam," it includes references to every plant known to occur there, with particular attention to those which have been described as species new to science. The descriptive catalogue of plants covers 234 pages. The principal plants used for food—fibre, oil, starch, sugar, and forage in the tropical islands acquired by this country—are discussed and their common names are given, not only for Guam, but also for the Philippine Islands, Samoa, Hawaii, and Porto Rico. The methods of cultivating them are given in detail, and the preparation of their derivative products, such as arrow root, coprá, and cacao.

Mr. Safford also studied the archives of Guam, and his account of the discovery, early history, and explorations of the island, with its climate, ethnology, and economic conditions, affords the most comprehensive and authentic picture of Guam thus far published. There are 70 illustrations, including a map of Guam, and half-tone

pictures of many plants, forests, typical native dwellings, Government buildings, and settlements.

The author has much to say of the dispersal of plants by ocean currents. The east coast of Guam is the windward side, and along its sandy beaches is a line of drift, just above high-water mark, rich in seeds, fruit, and drift-wood, brought by the great ocean current which sweeps across the Pacific from east to west. Many of these seeds and logs are covered with teredo borings or with barnacles, but often they are fresh and little worn by the erosion of waves and sand. Many seeds are dead, but some are alive and capable of germination.

Not all the species have gained a foothold on the island. The seeds of plants, for example, which grow in muddy estuaries or mangrove swamps, cannot establish themselves on a clear sandy beach. Nuts of the nipa palm are washed ashore in perfect condition, but can grow only near the mouths of streams where the water is brackish. Germinating fruits of *Rhizophora* and *Bruguiera* come ashore only to die. Many cocoanuts come in the drift, but on the east coast, where they are washed ashore, there is not a single cocoa grove, while on the west or leeward side, where the groves are planted, they thrive near the sea. It seems probable that cocoanuts grow in Guam only where they have been planted, except in cases where nuts that have fallen from local trees have taken root.

Many seeds are sufficiently buoyant to float on the surface of the drift. Sea-beans, for example, inclose an air-space between their cotyledons; others have kernels which do not fill their shells, but leave a space for air to keep them afloat; others have fibrous husks composed of light tissue; others have woody or coat-like shells of low specific gravity, and still others have a separate air-chamber. Mr. Safford mentions a large number of these fruits and seeds that are brought ashore.

With Schimper as a guide and the benefit of the experiments of Guppy and of Treub, a student on the island of Guam would find abundance of material and a most favorable opportunity for studying the seeds of the drift in the places where they have been deposited by the great trans-Pacific current, and where they could be observed in the process of germinating under absolutely natural conditions.

There are no indigenous quadrupeds. The only mammals in early times were two species of bats, the fruit-eating "flying fox" and a small insectivorous species, *Emballonura semicaudata*, Peale. The Norway brown rat was probably introduced by ships. It is very abundant, and a great pest, especially in the maize and cacao plantations. The common mouse, also introduced, causes little harm. An introduced deer, *Cervus mariannus* Desm., overruns the

island and causes great damage to crops. Its flesh has a fine venison flavour, and is a food staple of the natives. Buffalo, cattle, horses, mules, pigs, goats, cats, and dogs have been introduced. The buffalo are used for draught purposes, as in the Philippines. Horses do not multiply. Colts are born, but do not thrive.

The author describes the land-birds, the most beautiful being the rose-crowned fruit-dove, with plumage of green, yellow, and orange, and its head capped with rose purple. There are few reptiles. The natives do not engage so much in fishing as formerly, though they catch in nets and traps small fish swimming in schools near the beach.

The writer tells of the terrible hurricanes that visit the island at any season of the year, destroying native houses and crops, and stripping most of the vegetation of its foliage. The destruction in 1900 by two hurricanes caused a dearth of food, and the Government expended nearly $10,000 for the relief of the natives. Among the most serious results is the stripping of cocoa trees of their leaves. The inflorescence is formed in the axils of the older leaves, and if these are injured the flower-buds shrivel and the tree fails to produce. For this reason, in 1901, the year after the hurricanes, not an ounce of coprá, which is practically the only export of the island, was produced in Guam.

Many of the typhoons which sweep the Philippines apparently have their origin in the neighbourhood of the Marianne Islands, of which Guam is the most southern member. Dr. Abbe suggests, in a recent report, that a station be established on Guam for meteorological observations, to be connected by telegraph with Manila. This should be of great benefit to vessels in Philippine waters, giving warning of approaching high winds and indicating the kind of weather to be expected.

THE YERBA MATE.

This picture of the yerba mate tree is taken from *Globus* (No. 14, 1905), in which the mate and timber industries of the Misiones Territory of Argentina are described. Doubtless many North Americans have never seen a picture of the mate tree (*Ilex Paraguayensis*), the leaves of which, used like tea leaves to make an infusion for a beverage, make one of the important commercial articles of the southern part of South America. Thousands of per-